

Mapping habitat suitability and landscape connectivity for moose (*Alces alces*) in Central Europe

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Abstract

Fragmentation of habitats in increasingly human-dominated landscapes is one of the main factors contributing to the ongoing global biodiversity crisis, and particularly puts large mammals at risk, which depend on extensive habitats and functioning corridors between them. The recent recoveries of large wildlife species in Europe are therefore highly relevant from a conservation perspective. However, the pathways and future prospects of these recolonizations still remain poorly understood, and most studies so far have been focusing on carnivores. Here, I studied the case of the European moose as a representative of large herbivores with high requirements for vegetation cover and undisturbed areas that has recently shown tendencies towards a range expansion. The main aim of this study was to evaluate the potential for recolonization and range expansion of moose into Central Europe. I applied state-of-the-art habitat modeling techniques (Maxent and BRT) to identify potential moose habitat in Central Europe. Subsequently, I assessed connectivity across the landscape and between potential habitat patches using least-cost path and circuit theory models. Results showed considerable areas with potential moose habitat in Central Europe that are currently unoccupied. Connectivity analyses revealed substantial limitations for movement of moose, with an east-west gradient of strongly decreasing landscape connectivity and corridor quality. Therefore, my analyses overall indicate currently limited potential for a range expansion of moose further into Central Europe. Measures to improve connectivity across the landscape are urgently needed to enable movement of moose and other large mammals, and to maintain a functional network of ecosystems. My analyses provide a relevant starting point for more detailed assessments of potential conservation actions by identifying priority areas where measures to improve connectivity are most urgently needed.



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